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Reply to Office Action of April 12, 2006

### REMARKS

In regard to the Examiners' objections to the drawings under 37 CFR 1.84(p) and (q), Applicants have added the request lead lines and removed the brackets. Attached are replacement drawings for Figures 2(a) – (f), 3, 4, 5(a), and 6. In particular, Figures 2(d) – 2(f) have been amended to replace the brackets with lead lines. Figures 3 and 4 have been amended to replace the brackets from the originally filed drawings with lead lines. Figures 5(a) and 6 have been amended to replace the brackets with lead lines. Figure 6 has also been amended to include a lead line for reference character 40.

Regarding the Examiner's objection to the drawings under 37 C.F.R. 1.83(a), Applicants submit that each feature is either shown in the drawings, or is not necessary for the understanding of the invention. Regarding claims 1 and 11, Fig. 2(e) clearly shows the jig being attached to a mother substrate 5. Regarding claims 7 and 18, Fig. 2(e) clearly shows the jig being attached to a mother substrate 5 after the height restricting means and/or cover is removed, as currently claimed. Regarding claim 14, any one of Figures 2(d), 2(e), 3, 4, 5(a), 5(b), and 6 show the box shaped jig comprised of the vertical walls of the body 15 or the height restriction members 33. More specifically, Figure 5(b) clearly shows two pair of parallel opposed side walls 33. Figures 2(d), 2(e), 3, 4, while being limited to a cross-section view of the box shaped member, when read in light of the specification, clearly teaches that the semiconductor modules 2 are surrounded on all sides by the walls of the body 15 in these

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embodiments. This necessarily requires the box-shaped member be comprised of two pair of parallel opposed side walls of the body 15.

Regarding the Examiner's objection of claims 16 and 17, Applicants note that the claims now require that the jig include a removable cover that is removed prior to mounting the jig on the mother substrate.

Regarding the Examiner's objection of claims 19 through 21, Applicants submit that a drawing is not necessary for the understanding of these aspects of the invention. More specifically, one of ordinary skill the art in reviewing the drawings of the assembly jig and the supporting specification regarding the functional aspects of portions of the assembly jig would not need a further drawing in order to fully understand and be able to build a device which limits the deformation and/or height of the stacked semiconductor modules during a manufacturing process.

Regarding the Examiner's objection to the specification as failing to provide antecedent basis for "comprising a box shaped member positioned on said base member" in regard to claim 2, Applicants respectfully direct the Examiner's attention to figure 6 and the supporting portion of the specification, which clearly shows a box shaped member and including walls 33 positioned on the base member and 31.

Regarding the Examiner's rejection of claims 1, 2, 7, 11, 14, and 16 through 21, Applicants submit that in light of the amendments to the claims and the arguments set forth

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immediately above, Applicants have obviated the Examiner's rejection and respectfully request that it be withdrawn.

In regard to the Examiner his rejection of claims 2 and 18 through 20 under 35 U.S.C. § 112, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention, Applicants respectfully submit that the claims have been amended in order to further clarify the meaning of the term "box shaped." In light of the foregoing Applicants respectfully request that the Examiner withdraw the rejection.

Applicants respectfully request reconsideration of Examiner's rejection of claims 1, 2, 7, 11, 14, and 17 - 21 under 35 U.S.C. §112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements. More specifically, Applicant's have amended the claims to more clearly recite the relationship between the height restriction mechanism and the lateral position restriction mechanism. Regarding the alignment mechanism, Applicants submit that there is no lease and shall structural cooperative relationship between this comment and any one of the position restriction mechanism where the height restriction mechanism. More specifically, as shown in the drawings, the alignment mechanism may comprise positioning pins and slots 20/22 (See Figure 2(e), and Figure 4), the alignment mechanism may comprise guide pins 32 (See Figure 5(a) and 5(b)), or the alignment mechanism may comprise guide pins 41 (See Figure 6). Accordingly, the alignment mechanism may be formed in the base member (Figures 5(a) and

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6), in the horizontal alignment mechanism (Figures 2(d), 2(e), and 4), and/or may pierce through the semiconductor modules (Figure 6). Accordingly, there is no *necessary* structural relationship between the alignment mechanism and a position restriction mechanism or the height restriction mechanism.

In light of the foregoing Applicants respectfully request the Examiner withdraw the 35 U.S.C. § 112 rejection and place these claims in condition for allowance.

Applicants respectfully request reconsideration of Examiner's rejection of Claims 1, 2, 7, 14, 16, and 18 – 21 under 35 U.S.C. §102(b) as being unpatentable over Carlson (U.S. Patent No. 4,953,005). Carlson is directed to a structure and which a plurality of tape automatic bonding (TAB) film 140 with an attached integrated circuit die devices are stacked together via a plurality sandwiched layers 702. As shown in figures 28 and 46, electrical connections between each TAB layer are formed in the elaborate groove structure 712/714/716 formed in the stack. For any number of reasons, such a disclosure fails to teach or suggest Applicants' currently claimed invention. Applicants will attempt to address at least a few.

First, Applicants submit that Carlson is non-analogous art. In the *Deminski* case, the CAFC held that "The determination that a reference is from a non-analogous art is therefore two-fold. First, we decide if the reference is within the field of the inventor's endeavor. If it is not, we proceed to determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved." *In re Deminski*, 796 F.2d 436, 442 (Fed.

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Cir. 1986). A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem. *In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992).

In *Wang Laboratories*, the Federal Circuit held considered the issue of whether a single in-line memory modules ("SIMMs") having eight word data storage chips capable of storing 8-bit words (bytes) and a ninth parity bit chip packaged in plastic leaded chip carriers ("PLCCs") is "in the same field of endeavor" as that of the newly asserted Allen-Bradley patent (the " '392") and its commercial counterpart (the "X9 SIMM"). The '392 patent disclosed a SIMM with nine memory chips (8 data, 1 error detection) mounted in a single row. Allen-Bradley sold the X9 SIMM in a programmable controller consisting of chips encapsulated in ceramic dual in-line packages mounted on an epoxy-glass printed circuit board substrate. The CAFC held that "The Allen-Bradley art is not in the same field of endeavor as the claimed subject matter merely because it relates to memories. It involves memory circuits in which modules of varying sizes may be added or replaced; in contrast, the subject patents teach compact modular memories." *Wang Laboratories, Inc. v. Toshiba Corp.*, 993 F.2d 858, 26 USPQ2d 1767 (Fed. Cir. 1993).

In regard to the second prong of the analogous / non-analogous test set forth in *Deminski*, the CAFC found that "Wang's SIMMs were designed to provide compact computer memory with minimum size, low cost, easy repairability, and easy expandability. ... In contrast, the Allen-Bradley patent relates to a memory circuit for a larger, more costly

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industrial controller. SRAMs were used by Allen-Bradley because of their intended industrial environment. According to Dr. Frey, size was not a consideration in the Allen-Bradley work. Thus, there is substantial evidence in the record to support a finding that the Allen-Bradley prior art is not reasonably pertinent and is not analogous." *Wang Lab. v. Toshiba Corp.*, 993 F.2d 858, 865 (Fed. Cir. 1993).

In this case, as noted on pages 4 and 17 and in Figures 1(a) – 1(c) of Applicant's disclosure, prior art manufacturing processes utilizing stacked printed wiring boards and employing interlayer connections between these wiring boards utilizing bumps and soldering paste resulted in the variances and height and alignment of the wiring boards due to warp. Such warp resulted in a connection failure and resultant device failure of the manufactured semiconductor device. In addition, variances in the resultant dimensions of the module were problematic in themselves as they caused designers to anticipate variances when determining overall design constraints. Applicant's invention is directed at solving these problems in the art. Carlson, on the other hand, fails to teach or suggest anything regarding the problem of warp on stacks of printed wiring boards during subsequent manufacturing processes. More specifically, the tape automatic bonding film (TAB) utilized in the semiconductor modules stacked fails to exhibit the same penchant for warp as printed wiring boards. Applicants submit that Carlson is not in the field of Applicant's endeavor (assembly jig for stacked printed wiring boards) and is not reasonably pertinent to the particular problem with which the applicant was concerned. More specifically, the TAB film is not subject to the same warping issues, and is not subject to the same alignment issues regarding interconnection of

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surface-level bumps, as Applicant's invention is directed. Accordingly, Applicants submit that just as in Wang, the device disclosed in Carlson and that currently claimed by Applicants are entirely non-analogous, and therefore respectfully request that the Examiner withdraw the 35 U.S.C. § 102 rejection.

Second, in regard to the Carlson reference, Applicants submit that Carlson fails to teach or suggest anything regarding the elements of each independent claim requiring that the semiconductor modules be comprised of one or more semiconductor chips secured to printing wiring boards that have electrical connections on a top and bottom surface thereof and wherein an adjacent semiconductor modules are secured to one another by solder connections between respective top and bottom surfaces thereof. Instead, Carlson teaches the use of TAB film and the interconnection of layers via an inter-network of side grooves as shown in Figure 28. Such a disclosure fails to anticipate either one of these critical limitations.

Furthermore, Carlson fails to teach or suggest the use of either the walls of the housing or the cover 773 to restrict the dimensions of the layers 702. Applicants submit that, counter to the Examiner's remarks, the housing and cover would not inherently restrict the dimensions of the layers 702. More specifically, Applicant's have found that by forming the dimensions of the jig to substantially the same dimensions as to the semiconductor modules within the jig, and by forming a cover which interfaces with the side walls/pins of the jig, the warp of the semiconductor modules can be reduced or eliminated. Carlson fails to teach or suggest such a device, and Applicants submit that such a function is not inherent. More specifically, Applicants submit that the dimensions of the housing 772 of Carlson are not

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formed so as to limit the movement of the stack 700 in Figure 35. Applicants submit that such limitations are functional, and serves to define the bounds of the patent protection desired. (See MPEP §2173.05(g)). Carlson further fails to disclose that the jig prevent the deformation of the semiconductor modules contained therein during a subsequent manufacturing process such as a reflow. More specifically, as clearly disclosed by the Carlson reference, the stack of TAB tape devices are already formed an interconnected at the point in time when the stack is placed into the housing 772. Therefore, the device in Carlson fails to provide a semiconductor device assembly jig resistant to the elements applied in a subsequent manufacture process, such as the heat applied in a reflow process.

Finally, Applicants note that Carlson fails to teach or suggest the use of a solid base member (the bottom 776 of the housing 772 in Carlson is open), and fails to teach or suggest the use of a removable height restriction mechanism which is removed prior to mounting the jig to the mother substrate.

In regard to the Examiner's rejection of claims 7, 11, 16, and 17 under 35 U.S.C. §103 in view of Carlson and Yanagida (U.S. patent No. 6504241), Applicants submit that for at least the reasons stated above, these claims are also distinguishable over the cited prior preferences. Yanagida fails to compensate for the shortcomings of the Carlson reference. In light of the foregoing, Applicants respectfully requests that the Examiner withdraw the rejections and place these claims in condition for allowance.

In conclusion, and based upon the above amendments and remarks, Applicants respectfully submit that all claims now stand in condition for allowance.

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Respectfully submitted,

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**AMENDMENTS TO THE DRAWINGS:**

The attached sheets of drawings include changes to Fig.'s 2(d), 2(e), 2(f), 3, 4, 5(a), and 6.

The lead line extensions requested by the Examiner have been added. The brackets referenced by the Examiner have been removed and replaced with lead lines. No new matter has been added.

Attachment: Replacement Sheets

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